

2018 53rd International Universities Power Engineering Conference (UPEC 2018)

**Glasgow, United Kingdom
4-7 September 2018**

Pages 1-638



**IEEE Catalog Number: CFP18569-POD
ISBN: 978-1-5386-2911-6**

**Copyright © 2018 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP18569-POD
ISBN (Print-On-Demand):	978-1-5386-2911-6
ISBN (Online):	978-1-5386-2910-9

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

TABLE OF CONTENTS

IMPACT OF POWER CONDITIONING SYSTEMS WITH ADVANCED INVERTER CAPABILITIES ON THE DISTRIBUTION NETWORK	1
<i>Taha Selim Ustun ; Yuki Aoto</i>	
DESIGN OF A PV-POWERED DC WATER PUMP SYSTEM FOR IRRIGATION: A CASE STUDY	7
<i>Kerry A. Sado ; Lokman H. Hassan ; Mahmoud Moghavvemi</i>	
SOLAR PANEL MAINS INVERTER WITH IMPROVED EFFICIENCY	13
<i>Chi-Thang Phan-Tan ; Nam Nguyen-Quang ; Joe Connell ; Noel Barry ; Colin Levis ; Martin Hill</i>	
A STRATEGY TO EVALUATE SOLAR POWER GENERATION CAPABILITY BASED ON HISTORICAL DATA	18
<i>Deniz Sengül ; Murat Göl</i>	
HYBRID BATTERY-SUPERCAPACITOR MATHEMATICAL MODELING FOR PV APPLICATION USING MATLAB/SIMULINK	23
<i>Maria C. Argyrou ; Paul Christodoulides ; Christos C. Marouchos ; Soteris A. Kalogirou</i>	
A NOVEL BATTERY DIAGNOSTIC METHOD FOR SMART ELECTRIC VEHICLE CHARGER	29
<i>Sachio Nagamitsu ; Ryo Gondo ; Naoto Nagaoka ; Ahmed A Abdullah Al-Karakchi ; Ghanim Putrus ; Yue Wang</i>	
UNDERSTANDING MODEL PREDICTIVE CONTROL FOR ELECTRIC VEHICLE CHARGING DISPATCH	34
<i>Cesar Diaz ; Andrea Mazza ; Fredy Ruiz ; Diego Patino ; Gianfranco Chicco</i>	
HARMONIC RESONANCE ANALYSIS FOR VARIOUS DEGREES OF CABLE PENETRATION IN TRANSMISSION GRIDS	40
<i>Alexander Neufeld ; Nils Schükel ; Lutz Hofmann</i>	
MAPPING AND ANALYSIS OF THE REACTIVE POWER BALANCE IN THE SOUTH ZEALAND PART OF THE DANISH TRANSMISSION SYSTEM NETWORK	45
<i>Mads Øbro Nannestad ; Emil Kjær Jensen ; Peter Jan Randewijk</i>	
FEASIBILITY STUDY FOR A SOLAR PV MICROGRID IN MALAWI	51
<i>Aran Eales ; Lloyd Archer ; Hannah Buckland ; Damien Frame ; Stuart Galloway</i>	
REVIEW OF MULTI-BRP, AGGREGATOR SETTLEMENT MODELS AT LARGE-SCALE CONNECTIONS IN THE EUROPEAN ELECTRICITY SYSTEM	57
<i>Paul Wouter Bierling ; Rik Fonteijn ; Phuong Hong Nguyen</i>	
THE STRIJP-S LIVING-LAB: TESTING INNOVATIVE SOLUTIONS FOR FAULT PROTECTION, SELF-HEALING, CONGESTION MANAGEMENT, AND VOLTAGE CONTROL	63
<i>R. Fonteijn ; M.H. Roos ; P.H. Nguyen ; J. Morren ; J.G. Slootweg</i>	
UTILIZATION OF MMC-HVDC FOR PRIMARY AND SECONDARY CONTROL IN HYBRID ACDC POWER SYSTEMS	69
<i>Yannick Rink ; Lukas Held ; Simon Wenig ; Michael Suriyah ; Thomas Leibfried</i>	
CONTROL STRATEGY FOR SEAMLESS TRANSITION OF MICROGRID USING BATTERY ENERGY STORAGE SYSTEM	75
<i>Chawengsak Wanichrojanarat ; Paramet Wirasanti</i>	
IDENTIFICATION OF SYSTEM SPLIT TOPOLOGIES IN TRANSMISSION GRIDS	81
<i>Carola Cieslak ; Janek Massmann ; Cai Oliver Their ; Armin Schnettler</i>	
CONGESTION OF LV DISTRIBUTION NETWORKS BY HOUSEHOLD BATTERY ENERGY STORAGE SYSTEMS UTILIZED FOR FCR, AFRR AND MARKET TRADING	87
<i>Martijn Roos ; Bart Holthuisen</i>	
INCREASING SELF-SUFFICIENCY IN A MICRO GRID: INTEGRATED VS. NON-INTEGRATED ENERGY SYSTEM APPROACH	93
<i>Jonte Dancker ; Martin Wolter ; Jari Roßberg ; Evangelos Tsotsas</i>	
NETWORK MODEL REDUCTION: A HYBRID METHOD APPLIED TO A EUROPEAN MODEL FOR DYNAMIC SECURITY ASSESSMENT	99
<i>Robert Dimitrovski ; Stefan Horn ; Johannes Porst ; Gert Mehlmann ; Matthias Luther ; Jörg Michael Schmidt ; Chavdar Ivanov ; Matthias Abel ; Andreas Wasserrab ; Vladimir Milic</i>	
GENERALISATION OF THE LINE OUTAGE DISTRIBUTION FACTORS ON PHASE SHIFTING TRANSFORMERS	104
<i>Stefan Polster ; Herwig Renner</i>	
FUZZY LOGIC BASED SCHEME FOR DIRECTIONAL EARTH FAULT DETECTION AND CLASSIFICATION	110
<i>Radhwan Mohammed Saleem Dawood ; Gobind Pillai ; Maher Al-Greer</i>	

ESTIMATION AND SIZING OF FREQUENCY RESERVES FROM FLEXIBLE DEMAND UNITS	116
<i>Ana Turk ; Jayakrishnan R. Pillai ; Sanjay Chaudhary</i>	
PRIMARY FREQUENCY REGULATION WITH BATTERY ENERGY STORAGES IN WIND DOMINATED POWER SYSTEM	122
<i>Monika Sandelic ; Jayakrishnan R. Pillai ; Sanjay Chaudhary</i>	
ACTIVE DAMPING METHOD FOR HARMONIC CURRENT MITIGATION IN GRID-CONNECTED MMC-HVDC APPLICATIONS	128
<i>Carolin Hirsching ; Simon Wenig ; Max Goertz ; Michael Suriyah ; Thomas Leibfried</i>	
GENERATION ADEQUACY IN THE EUROPEAN POWER SYSTEM – AN ASSESSMENT IN THE COURSE OF TIME FROM 2010 TO 2025	134
<i>Philipp Baumanns ; Denis Vom Stein ; Niklas Van Bracht ; Ida Ballmann ; Albert Moser</i>	
EXTINGUISH THE COAL FLAME? THE IMPACT OF A LIGNITE AND HARD COAL PHASE-OUT ON THE EUROPEAN POWER SYSTEM	140
<i>N. Van Bracht ; D. Vom Stein ; A. Moser</i>	
PROPOSAL FOR THE STUDY OF SHORT-TERM LOAD FORECASTING MULTI-REGIONAL ERROR IMPACT IN THE OPERATION PLANNING	145
<i>L. N. Silva ; A. R. Abaide ; V. G. Negri ; A. G. Dornelles</i>	
NETWORK REINFORCEMENT APPLYING REDISPATCH-BASED INDICATORS	151
<i>Marco Franken ; Alexander B. Schrief ; Hans Barrios ; Armin Schnettler</i>	
POWER QUALITY IMPACT OF CHARGING STATION ON MV DISTRIBUTION NETWORKS: A CASE STUDY IN PEA ELECTRICAL POWER SYSTEM	157
<i>Thunpisit Pothinun ; Suttichai Premrudeepreechacharn</i>	
DEVELOPMENT OF WIDE AREA PROTECTION & COORDINATION FOR PEA'S 115 KV CLOSED LOOP TRANSMISSION LINES IN CHIANG MAI AREA	163
<i>Panupong Maneerat ; Suttichai Premrudeepreechacharn ; Autthaporn Supannon</i>	
IMPLICATION OF RENEWABLE POWER PLANTS ALLOCATION IN TRANSMISSION AND DISTRIBUTION GRIDS	169
<i>Monsalve Cristian ; Kharboutli Samir ; Nicolai Steffen</i>	
IMPACT OF FLOW-BASED MARKET COUPLING PARAMETERS ON EUROPEAN ELECTRICITY MARKETS	175
<i>Lothar Wyrwoll ; Katharina Kollenda ; Christoph Müller ; Armin Schnettler</i>	
DISTRICT ENERGY SYSTEM OPTIMISATION AND COMMUNICATION: A TWO-LEVEL APPROACH	181
<i>Ruben Rongstock ; Daniel Pfeiffer ; Ajit Toradmal ; Heinz Frank ; Jann Binder ; Martin Becker ; Bernd Thomas ; Christine Widmann</i>	
MITIGATION METHODS FOR OVER-VOLTAGE OCCURRENCE IN KOSOVO POWER TRANSMISSION NETWORK	187
<i>Njomza Ibrahim ; Vjollca Komoni ; Gazmend Kabashi ; Kadri Kadriu ; Faruk Serdarevic</i>	
DETERMINATION OF PREMATURE WEAR OF OVERHEAD LINE CONDUCTORS IN THE WAKE OF A WIND TURBINE	193
<i>Niall Williams ; Tim Kavanagh</i>	
COMBINED THERMO-ELECTRICAL SIMULATION MODEL FOR LARGE-SCALE BATTERY ELECTRICAL STORAGE SYSTEMS	199
<i>Jonte Dancker ; Stephan Balischewski ; Martin Wolter</i>	
INTEGRATION OF ELECTRIC VEHICLE PARKING LOT EQUIPPED WITH SOLAR POWER PLANT TO THE DISTRIBUTION NETWORK CONSIDERING OPTIMAL OPERATION CRITERIA	205
<i>Mehmet Tan Turan ; Yavuz Ates ; Erdin Gokalp</i>	
INTELLIGENT DECENTRALIZED APPROACH FOR REACTIVE POWER COMPENSATION BY VSC CONVERTER	211
<i>Sebastian Helm ; Eric Glende Otto ; Ines Hauer ; Martin Wolter</i>	
TECHNICAL INTEGRATION OF VIRTUAL POWER PLANTS ENHANCED BY ENERGY STORAGES INTO GERMAN SYSTEM OPERATION WITH REGARD TO FOLLOWING THE SCHEDULE IN INTRA-DAY	217
<i>Christian Ziegler ; André Richter ; Ines Hauer ; Martin Wolter</i>	
COMPARATIVE ANALYSIS OF BINNING AND SUPPORT VECTOR REGRESSION FOR WIND TURBINE ROTOR SPEED BASED POWER CURVE USE IN CONDITION MONITORING	223
<i>Ravi Pandit ; David Infield</i>	
DYNAMIC SIMULATION OF LOW-VOLTAGE DISTRIBUTION GRID WITH INTEGRATION OF POWER ELECTRONICS COUPLED LOADS AND GENERATORS	229
<i>Shangdan Yang ; Stephan Ruhe ; Falk Schaller ; Steffen Nicolai ; Peter Bretschneider</i>	

MODELLING AND SIMULATION OF ELECTRICAL PHENOMENA IN A REAL TIME TEST BENCH	234
<i>Stephan Ruhe ; Steffen Nicolai ; Peter Bretschneider</i>	
A NOVEL CALCULATION METHOD FOR STEADY-STATE SHORT-CIRCUIT CURRENTS IN MESHED DC-GRIDS	240
<i>Andreas Saciak ; Gerd Balzer ; Jutta Hanson</i>	
ANALYSIS OF VOLTAGE SAG IN TRANSMISSION SYSTEM AND ITS EFFECT ON LARGE CUSTOMERS OF CENTRAL-1 AREA OF LAO PDR	246
<i>Visanoukone Sothammavong ; Suttichai Premrudeepreechacharn ; Kanchit Ngamsanroj</i>	
INTEGRATION OF ONLINE TRANSFORMER CONDITION MONITORING INTO SCADA SYSTEMS	251
<i>Arief Basuki ; Suwarno</i>	
MIXED INTEGER NONLINEAR OPTIMIZATION OF COUPLED POWER AND GAS DISTRIBUTION NETWORK OPERATION	257
<i>Martin Zimmerlin ; Felicitas Mueller ; Martin Wilferth ; Lukas Held ; Michael R. Suriyah ; Thomas Leibfried</i>	
DECENTRALIZED SMART MULTI-AGENT VOLTAGE REGULATION IN ELECTRIC GRIDS. IDEOLOGY AND MODELING	263
<i>Alexander G. Fishov ; Irina L. Klavsuts ; Nurlan A. Karjaubayev ; Dmitry A. Klavsuts</i>	
INVESTIGATING THE POTENTIAL OF FLEXIBILITY IN UK STEELWORKS THROUGH ANCILLARY SERVICES	269
<i>Yuchang Wang ; Liana Cipcigan ; Meysam Qadrdan</i>	
A SMART GRID MODELLING TOOL FOR EVALUATING OPTIMAL CONTROL OF ELECTRIC VEHICLES	273
<i>Manuel Nicoli ; Ridoy Das ; Yue Wang ; Ghanim Putrus ; Roberto Turri ; Richard Kotter</i>	
TRANSIENT FAULT ANALYSIS IN OVERHEAD TRANSMISSION LINES	279
<i>Mahmood Parsi ; Peter A. Crossley</i>	
STUDY OF A THERMOELECTRIC REFRIGERATOR THROUGH CIRCUIT-BASED MODELS AND ELECTRO-THERMAL ANALOGY	285
<i>Diana Enescu ; Horia Leonard Andrei ; Ion Caciula ; Paul Cristian Andrei</i>	
EXPERIMENTAL ASSESSMENT OF THE TEMPERATURE CONTROL SYSTEM FOR A THERMOELECTRIC REFRIGERATION UNIT	291
<i>Diana Enescu ; Cesar Diaz ; Alessandro Ciocia ; Andrea Mazza ; Angela Russo</i>	
OPTIMAL STORAGE DESIGN AND OPERATION IN A NEW SETTLEMENT AREA UNDER CONSIDERATION OF SECTOR COUPLING AND RENEWABLE ENERGY GENERATION	297
<i>Muhammad Tayyab ; Ines Hauer ; Christian Klabunde ; Martin Wolter</i>	
A SOLID-STATE FAULT CURRENT LIMITING AND INTERRUPTING DEVICE (FCLID) WITH POWER FACTOR CORRECTION	303
<i>F. Paterakis ; C. C. Marouchos ; G. A. Putrus ; M. Darwish ; Christos Makarounas</i>	
EFFICIENCY COMPARISON OF AN ASYMMETRICAL HALF-BRIDGE PWM CONVERTER WITH SCHOTTKY AND SYNCHRONOUS RECTIFICATION	309
<i>Benedikt Kohlhepp ; Markus Barwig ; Thomas Dürbaum</i>	
SIMULATION AND TESTING OF A POWER CONVERTER FOR AIRCRAFT AC ELECTRIC POWER GENERATION SYSTEM USING SOFTWARE ELIMINATION OF HIGHER HARMONICS	315
<i>Vasily Kulmanov ; Alecksey Anuchin ; Vadim Ostrirov ; Anatoliy Rusakov ; Yuriy Vagapov</i>	
TWO-LAYER EARTH STRUCTURE PARAMETER ESTIMATION AND SEASONAL ANALYSIS	321
<i>Theofilos A. Papadopoulos ; Oguzhan Ceylan ; Grigoris K. Papagiannis</i>	
METHODOLOGY FOR HOME ENERGY MANAGEMENT TO INTEGRATION AND MANAGEMENT OF DISTRIBUTED ENERGY RESOURCES	327
<i>R. M. De Azevedo ; L. N. Canha ; W. S. Brignol ; V. J. Garcia ; Tiago A. Silva Santana ; A. Medeiros</i>	
BEHAVIOUR OF INDUCTION MACHINES UNDER FAULT CONDITIONS – APPLICATION OF THE INSTANTANEOUS SYMMETRICAL COMPONENTS METHOD	333
<i>Essam S Hamdi</i>	
PARTIAL SHADING AND GLOBAL MAXIMUM POWER POINT DETECTIONS ENHANCING MPPT FOR PHOTOVOLTAIC SYSTEMS OPERATED IN SHADING CONDITION	337
<i>Jirada Gosumbonggot ; Duy-Dinh Nguyen ; Goro Fujita</i>	
REVIEW OF ELECTRICALLY POWERED PROPULSION FOR AIRCRAFT	343
<i>Robert Cameron Bolam ; Yuriy Vagapov ; Alecksey Anuchin</i>	
A SIZING METHOD FOR DECENTRALIZED ENERGY STORAGE SYSTEMS OPERATING UNDER A PEAK SHAVING CONTROL STRATEGY	349
<i>Angelos I. Noutsilis ; Antonios A. Nikolaou ; Eleftherios O. Kontis ; Georgios C. Kryonidis ; Georgios C. Christoforidis ; Grigoris K. Papagiannis</i>	

MANAGE REVERSE POWER FLOW AND FAULT CURRENT LEVEL IN LV NETWORK WITH HIGH PENETRATION OF SMALL SCALE SOLAR AND WIND POWER GENERATION	355
<i>K. N. Bangash ; M. E. A. Farrag ; A. H. Osman</i>	
OPTIMIZATION AND COMPARISON OF FLUX-CONCENTRATING ND-FE-B GENERATOR CONSIDERING VARIABLE POWER FACTOR AND WIND CONDITIONS FOR A 6MW OFFSHORE WIND TURBINE	361
<i>Nurul Azim Bhuiyan ; Alasdair Mcdonald</i>	
LOW VOLTAGE DC MICROGRID PROTECTION SYSTEM - A REVIEW	366
<i>Waqas Javed ; Dong Chen</i>	
ROTOR THERMAL MODEL FOR REAL-TIME PROTECTION IN ADJUSTABLE INDUCTION MOTOR DRIVES.....	372
<i>Ksenia Fedorova ; Valentina Podzorova ; Igor Gulyaev ; Alecksey Anuchin</i>	
PEAK-TIME PRICING RATIO FOR ECONOMIC EVALUATION OF POWER GRIDS SYSTEM IN ZERO ENERGY BUILDING	376
<i>Pradita Octovianidingrum Hadi ; Goro Fujita ; Yasunobu Tanaka ; Keisuke Tagami</i>	
PREDICTION OF THE COAL GENERATION FOR THE DAY AFTER TOMORROW USING DERIVATIVE MARKET INFORMATION	381
<i>Andre Martins ; Rui Pestana ; C. I. Faustino Agreira</i>	
POWER QUALITY IMPROVEMENT OF PV-WECS MICROGRID USING ACTIVE POWER FILTER IN REALTIME	387
<i>M T L Gayatri ; Alivelu M Parimi</i>	
LOW COST CURRENT MEASUREMENT OF THREE PHASE CABLES	393
<i>Matthew Strickland ; Dani Strickland ; Andrew Cross ; Brian Goss ; Mina Abedi-Varnosfaderani ; Terry West</i>	
EXPERIMENTAL ANALYSIS OF VARIOUS COMMUNICATION TECHNOLOGIES IN AMI SYSTEMS	399
<i>Ching-Yi Hsueh ; Wei Huang ; Wu-Chieh Wu ; Chin-Yao Chang ; Ming-Feng Dong ; Chien-Tang Chiu</i>	
MITIGATION OF TORSIONAL OSCILLATIONS HAZARD IN CASCADED INDUCTION MOTORS DRIVING A LARGE MECHANICAL LOAD.....	405
<i>K. E. Amin ; R. M. Hamouda ; A. Abu Siada ; M. A. El-Dessouki</i>	
SYNTHETIC DISTRIBUTION GRID GENERATION USING POWER SYSTEM PLANNING: CASE STUDY OF SINGAPORE	410
<i>Andrej Trpovski ; Dante Recalde ; Thomas Hamacher</i>	
POWER TRANSFORMER NOISE ANALYSIS BASED ON ALL-PHASE FFT AND FILTERING TECHNIQUE.....	416
<i>Xiaojuan Zhao ; Yaqi Zhou ; Xiaorong Zhao ; Xiaojun Zhu ; Zhu Zhu ; Haoreng Dai ; Hongsheng Shi</i>	
ON THE TEACHING OF ELECTRICAL MACHINES AND DRIVE SYSTEMS	422
<i>Essam S Hamdi ; John Paul Spivey</i>	
DIELECTRIC PROPERTIES OF NANOIL IMPREGNATED PAPER INSULATION SYSTEM.....	428
<i>Manal M. Fayed ; Diaa-Eldin A. Mansour ; Mohamed A. Izzularab</i>	
OVERCURRENT AND OVERVOLTAGE TESTING OF A MULTIFUNCTIONAL SUPERCONDUCTING COIL	432
<i>Doaa M. Yehia ; Diaa-Eldin A. Mansour ; Weijia Yuan</i>	
A FULLY DISTRIBUTED REACTIVE POWER CONTROLLER FOR A WIND FARM TO MINIMIZE POWER LOSSES	436
<i>Haocheng Luo ; Zechun Hu ; Jian Ning ; Changming Jiang ; Siqing Niu ; Jian Yang</i>	
A MODIFIED PARTICLE SWARM OPTIMIZATION BASED MAXIMUM POWER POINT TRACKING FOR PV SYSTEMS	442
<i>Muhammad Alshareef ; Zhengyu Lin</i>	
LOAD AND PV GENERATION FORECAST BASED COST OPTIMIZATION FOR NANOGRIDS WITH PV AND BATTERY	448
<i>M. Ugur Gudelek ; Cem R. Cirak ; Efe Arin ; Mustafa Erdem Sezgin ; A. Murat Ozbayoglu ; Murat Gol</i>	
IMPACT OF THE STATE ESTIMATION IN DIFFERENT SCENARIOS AND TOPOLOGIES IN A POWER DISTRIBUTION SYSTEM.....	454
<i>Emerson R. Da Silva ; Daniel P. Bernardon ; Robson P. Delavechia ; Mauro S. Ortiz ; Rafael G. Milbradt ; Luciane N. Canha ; Wagner S. Hokama</i>	
SEASONAL EFFECT ON THE FLEXIBILITY ASSESSMENT OF ELECTRICAL DEMAND.....	460
<i>Muhammad Waseem ; Intisar Ali Sajjad ; Roberto Napoli ; Gianfranco Chicco</i>	
DIMENSIONING OF BATTERY STORAGE AS TEMPORARY EQUIPMENT DURING GRID REINFORCEMENT CAUSED BY ELECTRIC VEHICLES.....	466
<i>Lukas Held ; Hannah Krämer ; Martin Zimmerlin ; Michael R. Suriyah ; Thomas Leibfried ; Levin Ratajczak ; Selma Lossau ; Martin Konermann</i>	

PARTICIPATION OF CUSTOMERS TO VIRTUAL POWER PLANTS FOR REACTIVE POWER PROVISION	472
<i>Jibrán Ali ; Stefano Massucco ; Federico Silvestro ; Andrea Vinci</i>	
A TURNKEY SOLUTION FOR EXTRUDED CABLE TESTING	478
<i>Claudius Freye ; Saskia Frobin ; Christoph Felix Niedik ; Frank Jenau ; Dominik Häring ; Gero Schröder ; Matthew Kirkley ; André Männecke</i>	
ELECTRIC VEHICLES IN NORWAY AND THE POTENTIAL FOR DEMAND RESPONSE	484
<i>Hanne Sæle ; Idar Petersen</i>	
PROTOTYPE FOR ESTIMATION AND FORECASTING OF THE FUTURE DEMAND AND GENERATION FROM HOUSEHOLDS IN SELECTED EUROPEAN COUNTRIES	490
<i>Hanne Sæle ; Kjersti Berg ; Henrik Landsverk ; Julian Wruk ; Kevin Cibis ; Robert Macdonald</i>	
OPEN CIRCUIT STATOR WINDING FAULT DETECTION OF INDUCTION MACHINES FROM TRANSIENT DATA USING NATURE INSPIRED OPTIMIZATION ALGORITHMS	496
<i>Salaheddine Ethni ; Andrew Smith ; Hamza Khalfalla ; Muez Shiref</i>	
UTILIZATION OF DISTRIBUTED ENERGY RESOURCES' FLEXIBILITY IN POWER SYSTEM OPERATION – EVALUATION OF TODAY'S STATUS AND DESCRIPTION OF A FUTURE CONCEPT	502
<i>Hanne Sæle ; Andrei Z. Morch ; Evangelos Rikos ; Silvia M. Canevese Silvia Maria ; Michal Kosmecki Ien</i>	
A NOVEL STRUCTURE OF A MODULAR INTERLEAVED DC/DC CONVERTER FOR RENEWABLE STREET LIGHTING SYSTEMS	508
<i>Farag S. Alargt ; Ahmed S. Ashur ; Ahmad H. Kharaz</i>	
POWER CABLE COST BENEFIT ANALYSIS: A CRITICAL REVIEW	514
<i>Yang Yang ; Mohamed Darwish ; Mansour Moghadam ; Charles Lucas-Clements ; Gareth Obrien ; Dominic Quennell</i>	
MANAGEMENT ALGORITHMS FOR CASCADED H-BRIDGE MULTILEVEL INVERTERS	520
<i>Markus Herzog ; Andreas W. Ebentheuer ; Taha Lahlou ; Hans-Georg Herzog</i>	
SIMULATION FRAMEWORK FOR MULTI-CARRIER ENERGY SYSTEMS WITH POWER-TO-GAS AND COMBINED HEAT AND POWER	526
<i>Johannes Ruf ; Martin Zimmerlin ; Patrick S. Sauter ; Wolfgang Köppel ; Michael R. Suriyah ; Mathias Kluwe ; Sören Hohmann ; Thomas Leibfried ; Thomas Kolb</i>	
LOSSES ALLOCATION METHODS IN PLANNING AND MANAGEMENT OF LOW VOLTAGE ACTIVE DISTRIBUTION NETWORKS	532
<i>Muhammad Usman ; Marco Vanzetto ; Massimiliano Coppo ; Fabio Bignucolo ; Roberto Turri</i>	
A PRACTICAL COURSE FOR TEACHING ELECTRIC MACHINES WITH RENEWABLE ENERGY SOURCES	538
<i>H. Amreiz ; Al Janbey ; M. Darwish</i>	
COST EFFECTIVE MICROHYDRO-BASED MICROGRID SCHEMES FOR RURAL ELECTRIFICATION IN SOUTH AFRICA	544
<i>Himal Patel ; Sunetra Chowdhury</i>	
SEMI-CENTRALIZED CONTROL OF DISTRIBUTED GENERATION IN SMART GRIDS	550
<i>Oguzhan Ceylan ; Ioana Pisica ; Sumit Paudyal</i>	
REVIEW AND EVALUATION OF THE STATE OF THE ART OF DC FAULT DETECTION FOR HVDC GRIDS	555
<i>Vasileios Psaras ; Abdullah Emhemed ; Grain Adam ; Graeme Burt</i>	
THERMAL INERTIA OF A BUILDING AS VIRTUAL ENERGY STORAGE: A SUSTAINABLE SOLUTION FOR SMART GRIDS	561
<i>Orthi Sikder ; Peter Mark Jansson</i>	
ANALYSIS OF MOBILE DIESEL GENERATOR OPERATION TO COPE WITH EXTENDED LOSS OF ALL AC POWER IN NUCLEAR POWER PLANT	567
<i>Ji-Kyung Park ; Jae-Do Lee ; Hong-Seok Jang ; Hyun-Shin Park</i>	
A STUDY ON APPLICATION OF THE LITHIUM-ION BATTERY FOR COPING WITH EXTENDED STATION BLACKOUT	571
<i>Sungbaek Park ; Yung-Mi Kim ; Pyeong-Yeon Lee ; Jonghoon Kim</i>	
BATTERY ENERGY STORAGE SYSTEM CONTROL FOR VOLTAGE REGULATION IN MICROGRID WITH HIGH PENETRATION OF PV GENERATION	576
<i>Chaowanán Jamroen ; Akekachai Pannawan ; Siriroj Sirisukprasert</i>	
FUZZY BASED CONTROL OF GRID-CONNECTED PHOTOVOLTAIC SYSTEM FOR ENHANCING SYSTEM INERTIAL RESPONSE	582
<i>Rijo Rajan ; Francis M. Fernandez</i>	
RESONANCE MODE ANALYSIS OF CABLING IN THE TRANSMISSION SYSTEM	588
<i>Matthias Quester ; Markus Knittel ; Paul Raffelsiefen ; Armin Schnettler</i>	

A STUDY OF DIFFERENT LOSS OF LIFE BASED CALCULATIONS ON BATTERIES OPERATING IN ENHANCED FREQUENCY RESPONSE	594
<i>Heather Nute ; Dani Strickland ; Mina Abedi-Varnosfaderani</i>	
GRID SUPPORTING INVERTER FOR TRANSIENT LOAD RELIEF IN ISLANDED MICROGRIDS	600
<i>Christina Fuhr ; Tilman Wippenbeck ; Dominik Mairhofer ; Frederik Puhe ; Jutta Hanson</i>	
CLASSIFICATION OF MULTIPLE ELECTROMAGNETIC INTERFERENCE EVENTS IN HIGH-VOLTAGE POWER PLANT	606
<i>Imene Mitiche ; Gordon Morison ; Alan Nesbitt ; Michael Hughes-Narborough ; Brian G. Stewart ; Philip Boreham</i>	
A WIRELESS COMMUNICATION SYSTEM FOR A QUADROTOR HELICOPTER	610
<i>Ajay K Joseph ; Amar Bousbaine ; Abdelkader Fareha</i>	
EXPERIMENTAL CHARACTERISATION OF QUAD ROTOR CONTROLLER BASED ON KALMAN FILTER	615
<i>Abdelkader Fareha ; Amar Bousbaine ; Ajay K Josaph</i>	
MODULAR CONFIGURABLE AND TESTABLE AUTOMATION ARCHITECTURE FOR FUTURE ACTIVE ELECTRICAL ENERGY GRIDS	621
<i>Björn Bauernschmitt ; Rajkumar Palaniappan ; Dominik Hilbrich ; Christian Rehtanz</i>	
ANALYSIS OF SHORT CIRCUIT CAPABILITY OF COPPER SCREENS IN MEDIUM VOLTAGE (52 KV) CABLES WHEN SUBJECTED TO SINGLE PHASE EARTH FAULTS	627
<i>Aaron Collier ; Tom Looby ; Donal Finn</i>	
ADVANCEMENTS IN DISTRIBUTED POWER FLOW CONTROL	633
<i>Oliver Pohl ; Florian Rewald ; Stefan Dalhues ; Pascal Jörke ; Christian Rehtanz ; Christian Wietfeld ; Andreas Kubis ; Ruben Kentchim Tamgue ; Detlev Kirsten</i>	
SYMPATHETIC TRIPPING IN A FIELD CASE STUDY	639
<i>Anastasia N. Stefanidi ; Ioannis A. Panos ; Apostolos N. Milioudis ; Georgios T. Andreou</i>	
APPLICATION OF IMPROVED PHASE-SHIFTED PULSE WIDTH MODULATION WITH THIRD HARMONIC INJECTION TO HYBRID MODULAR MULTI-LEVEL CONVERTER	644
<i>Mohammad Mohsen Rahimian ; Majid Hosseinpour ; Malabika Basu ; Michael Farrell ; Shahab Sajedi</i>	
GRID IMPEDANCE ESTIMATION FOR SINGLE PHASE PV GRID TIE INVERTER BASED ON STATISTICAL SIGNAL PROCESSING TECHNIQUES	650
<i>Hamza Khalfalla ; Salaheddine Ethni ; M. Shiref ; Maher Al-Greer ; Volker Pickert ; Matthew Armstrong</i>	
COMPARATIVE STUDY OF TCSC AND SVC PERFORMANCE ON DYNAMIC VOLTAGE STABILITY OF AN ELECTRIC POWER SYSTEM	655
<i>R. M. Monteiro Pereira ; Adelino J. C. Pereira ; C. M. Machado Ferreira ; F. P. Maciel Barbosa</i>	
COMPARATIVE ASSESSMENT OF UNIT COMMITMENT METHODS FOR ISOLATED ISLAND GRIDS	662
<i>Georgios N. Psarros ; Stavros A. Papathanassiou</i>	
REQUIREMENTS FOR POWER HARDWARE-IN-THE-LOOP EMULATION OF DISTRIBUTION GRID CHALLENGES	668
<i>Sebastian Hubschneider ; Sebastian Kochanek ; Bernd Bohnet ; Michael Suriyah ; Ingo Mauser ; Thomas Leibfried ; Hartmut Schmeck ; Michael Braun</i>	
A NOVEL SWITCHING PATTERN OF MODIFIED SVPWM FOR Z-SOURCE INVERTER CONNECTED TO A MULTI-SOURCE SYSTEM	674
<i>Younes Riache ; Essam S Hamdi</i>	
BATTERY ENERGY STORAGE MANAGEMENT FOR SMART RESIDENTIAL BUILDINGS	679
<i>Viktor Stepaniuk ; Jayakrishnan Pillai ; Birgitte Bak-Jensen</i>	
OPTIMISATION AND SIMULATION OF RC TIME CONSTANTS IN SNUBBER CIRCUITS	685
<i>Sat Mohanram ; M. Darwish ; C.C Marouchos</i>	
CENTRALLY MANAGED STORAGE FACILITIES IN SMALL NON-INTERCONNECTED ISLAND SYSTEMS	691
<i>Georgios N. Psarros ; Spiros P. Kokkolios ; Stavros A. Papathanassiou</i>	
POWER LOSS COMPARISON OF DC SIDE AND AC SIDE CASCADED MODULAR MULTILEVEL INVERTERS	697
<i>Shahab Sajedi ; Malabika Basu ; Michael Farrell</i>	
CONCEPTUALIZING A DECISION MAKING PROCESS MODEL AROUND ASPECTS INFLUENCING CONSUMERS CONSIDERING PURCHASE OF ELECTRIC VEHICLES	702
<i>Sennan Mattar ; Shuja Ansari ; Hani Al-Madni</i>	
AN ANALYSIS OF LARGE-SCALE TRANSMISSION POWER BLACKOUTS FROM 2005 TO 2016	707
<i>Maxime Velay ; Meritxell Vinyals ; Yvon Besanger ; Nicolas Retiere</i>	

AN INVESTIGATION INTO THE LIMITATIONS OF THE COMBINED DV/DT AND DI/DT PROTECTION TECHNIQUE FOR COMPACT D.C. DISTRIBUTION SYSTEMS	713
<i>Allan Smith ; Dong Wang ; Abdullah Emhemed ; Graeme Burt</i>	
ADVANTAGES OF THE VIRTUAL SYNCHRONOUS MACHINE REGULATION FOR INTEGRATING LOW-INERTIA VARIABLE RENEWABLE GENERATION IN TRANSMISSION SYSTEMS	719
<i>Fabio Bignucolo ; Riccardo Stecca ; Massimiliano Coppo</i>	
FUEL SAVINGS IN REMOTE ANTARCTIC MICROGRIDS THROUGH ENERGY MANAGEMENT	725
<i>Can Berk Saner ; Spyros Skarvelis-Kazakos</i>	
DECENTRALISED CONTROL OF DC MICROGRID BASED ON VIRTUAL ADMITTANCE TO ENHANCE DC VOLTAGE AND GRID FREQUENCY SUPPORT	731
<i>Syiska Yana ; Anthony Florida James ; Abdullah Emhemed ; Graeme Burt</i>	
AUTOMATING VIRTUAL POWER PLANT DECISION MAKING WITH FUZZY LOGIC AND HUMAN PSYCHOLOGY	737
<i>Spyros Skarvelis-Kazakos</i>	
STOCHASTIC TECHNICAL LOSSES ANALYSIS OF SMART GRIDS UNDER UNCERTAIN DEMAND	743
<i>J-A. Velasco ; H. Amaris ; M. Alonso ; M. Miguelez</i>	
DESIGN OF POWER PEAK SHAVING CONTROLLER FOR SINGLE-PHASE AC RAILWAY SYSTEMS	749
<i>Alessandro D'ambrosio ; Emerson Guest ; Nenad Mijatovic ; Vassilios G. Agelidis</i>	
CREATION OF NETWORK CASE STUDIES WITH HIGH PENETRATION OF DISTRIBUTED ENERGY RESOURCES	755
<i>Andrea Mazza ; Enrico Carpaneto ; Gianfranco Chicco ; Alessandro Ciocia</i>	
MODULATED PREDICTIVE CURRENT CONTROL TECHNIQUE FOR A THREE-PHASE FOUR-WIRE ACTIVE POWER FILTER BASED ON H-BRIDGE TWO-LEVEL CONVERTER	761
<i>Alfredo Renault ; Jorge Rodas ; Leonardo Comparatore ; Julio Pacher ; Raul Gregor</i>	
MODELLING OF HEAT PUMP LOAD PROFILES FOR GRID EXPANSION PLANNING	767
<i>Mirko Wahl ; Tom Droscher ; Julian Sprey ; Albert Moser</i>	
STORAGE OPTIMIZATION: BENEFITS BROUGHT BY STORAGE ITSELF, WITH AN ENERGY PRICE MINIMIZATION	773
<i>Ramona Vatu ; Oana Ceaki ; Radu Porumb ; George Seritan</i>	
DIRECT INSTANTANEOUS TORQUE CONTROL OF SWITCHED RELUCTANCE MOTOR FOR AEROSPACE APPLICATIONS	779
<i>N. K. Dankadai ; S. P. Mcdonald ; M. A. Elgendy ; D. J. Atkinson ; S. Ullah ; G. Atkinson</i>	
THE RETRIEVAL OF SYNCHROPHASORS USING CHIRPS	785
<i>Gan Tan ; Stephen Robson ; Abderrahmane Haddad</i>	
OPTIMAL OPERATION OF MULTI-TERMINAL SOFT OPEN POINT TO INCREASE HOSTING CAPACITY OF DISTRIBUTED GENERATION IN MEDIUM VOLTAGE NETWORKS	791
<i>Mohamed A. Abdelrahman ; Chao Long ; Jianzhong Wu ; Nick Jenkins</i>	
MODELING AND STABILITY ANALYSIS OF THE SUB-SYNCHRONOUS INTERACTIONS IN WEAK AC GRIDS WITH WIND POWER INTEGRATION	797
<i>Xiangyu Li ; Jun Liang ; Gen Li ; Tibin Joseph</i>	
MULTI-MACHINE TOPOLOGY VERSUS MONOLITHIC SWITCHED RELUCTANCE MACHINE IN LOW SPEED APPLICATIONS	803
<i>P. Lobato ; J. A. Dente ; J. F. Martins ; A. J. Pires</i>	
A GENERAL ANALYSIS OF THE DISTRIBUTED GENERATION IMPACT ON ELECTRICAL ENERGY PLANNING	809
<i>Priscila De Lima Vianna ; Matheus Sabino Viana ; Giovanni Manassero Junior ; Miguel Edgar Morales Udaeta</i>	
MODELING AND ANALYSIS OF THE REMAINING USEFUL LIFE OF MV XLPE CABLE: CASE STUDY OF OMAN OIL AND GAS POWER GRID	815
<i>M. Qatan ; M. Emad Farrag ; B. Alkali ; C. Zhou</i>	
PERFORMANCE ENHANCEMENT OF DC SYSTEM UNDER DISTURBANCES AND FAULTS USING SFCL	821
<i>Doaa M. Yehia</i>	
RESEARCH ON A 6-DOF MAGNETIC LEVITATION SYSTEM	826
<i>Mousa Lahdo ; Tom Ströhla ; Sergej Kovalev</i>	
LINEAR GENERATOR TECHNOLOGIES FOR WAVE ENERGY CONVERSION APPLICATIONS: A REVIEW	831
<i>Azza A. Faiad ; I. A. Gowaid</i>	

ANALYSIS OF MATERIAL EFFECT ON RAIL IMPEDANCE	837
<i>Mehran Mirzaei ; Pavel Ripka</i>	
IMPROVED STACKED ENSEMBLE BASED MODEL FOR VERY SHORT-TERM WIND POWER FORECASTING	843
<i>Monsef Tahir ; Ramadan El-Shatshat ; M.M.A Salama</i>	
PERFORMANCE ANALYSIS OF CSIR'S SOLAR PV PLANTS	849
<i>Sengiphile N Simelane ; Unarine B Mudau ; Talent Duma ; Daniel Sp Chowdhury</i>	
NOVEL METHOD FOR ENERGY MANAGEMENT FOR CATENARY FREE SYSTEM OPERATION	854
<i>Hussain Al-Ezee ; Chris Gould ; Sarath B Tennakoon</i>	
PARAMETER OPTIMIZATION OF DOCR AND FCL IN MICROGRIDS BASED ON GREY WOLF OPTIMIZER	860
<i>Jiang Yi ; Dongyuan Shi</i>	
A PV INTERFACE SYSTEM BASED ON HIGH-GAIN HIGH-FREQUENCY LINK CONVERTER	865
<i>Mostafa I. Marei ; Bader N. Alajmi ; Ibrahim Abdelsalam ; M. F. Alhajri</i>	
ADVANCED ON-LINE CONDITION MONITORING OF, AND INTER-TURN SHORT CIRCUIT DETECTION IN, POWER TRANSFORMERS	871
<i>Ehnaish Aburaghiega ; Mohamed Emad Farrag ; D M Hepburn ; Belen Garcia</i>	
DEVELOPMENT OF A DEMAND RESPONSE PROGRAM: A CASE STUDY OF CAIRO, EGYPT	877
<i>Eman Beshr ; Ahmed A. Raouf Mohamed</i>	
MAXIMUM POWER POINT TRACKING UNDER PARTIAL SHADING CONDITION USING PARTICLE SWARM OPTIMIZATION WITH DC-DC BOOST CONVERTER	882
<i>Ahmed Hossam El-Din ; S.F. Mekhamer ; Hadi M. El-Helw</i>	
A NEW INDEX FOR VOLTAGE QUALITY ASSESSMENT AT DISTRIBUTION SYSTEMS	888
<i>Mert Karaçelebi ; Murat Gol ; Özden Erçin</i>	
ENERGY STORAGE ALLOCATION IN POWER NETWORKS – A STATE-OF-THE-ART REVIEW	894
<i>Javier Lopez Lorente ; Xueqin Amy Liu ; Robert Best ; D. John Morrow</i>	
COOPERATION OF OFFSHORE WIND FARM WITH BATTERY STORAGE IN MULTIPLE ELECTRICITY MARKETS	900
<i>Peng Hou ; Guangya Yang ; Peter Enevoldsen ; Arne Hejde Nielsen</i>	
COMPARISON OF SINGLE-STAGE AND MULTI-STAGE MARX DC-DC CONVERTERS FOR HVDC APPLICATION	906
<i>Samir Milad Alagab ; Sarath Tennakoon ; Chris Gould</i>	
DESIGN OF SMART GENERATION BY INTEGRATING RENEWABLE ENERGY INTO WESTERN POWER GRID OF SAUDI ARABIA	912
<i>Fahad Aljahdali ; Maysam Abbod</i>	
EVALUATION OF CONSERVATION VOLTAGE REDUCTION IN A DISTRIBUTION GRID - A COMPARISON BASED METHOD	918
<i>Georgios Foskolos ; Oscar Lennerhag ; Susanne Acekby</i>	
IMPACT OF INSTALLATION OF 400 KV SHUNT REACTORS ON OMAN GRID	923
<i>H. A. Al Riyami ; A. G. Al Busaidi ; A. A. Al Nadabi ; M. N. Al Sayabi ; A. S. Al Omairi ; O. H. Abdalla</i>	
IMPLEMENTATION OF INTELLIGENT TUNING SYSTEM FOR PETERSEN COILS ON THE IRISH DISTRIBUTION NETWORK	929
<i>Michael O'donovan ; Eoin Cowhey ; Noel Barry</i>	
A METHODOLOGY TO SUPPORT THE ELECTRICAL NETWORK IN ORDER TO PROMOTE ELECTRIC VEHICLE CHARGING IN SMART CITIES	935
<i>Gillian Lacey ; Ghanim Putrus ; Edward Bentley</i>	
COMPENSATION OF VOLTAGE AND CURRENT DISTORTIONS IN MULTI MICROGRID	939
<i>M T L Gayatri ; Alivelu M Parimi</i>	
ASSESSMENT OF REACTIVE POWER MANAGEMENT TECHNOLOGIES CONSIDERING THEIR IMPACTS ON GRID OPERATION	945
<i>Jan Thomas Linde ; Rengin Idil Cabadag ; Peter Schegner</i>	
POWER SHARING ALGORITHM FOR VOLTAGE REGULATION IN ISLANDED DC MULTI-MICROGRID SYSTEM	951
<i>Gu-Chan Park ; Won-Poong Lee ; Dong-Jun Won</i>	
ECONOMIC OPERATION ALGORITHM FOR ENERGY STORAGE SYSTEM WITH CUSTOMER BASELINE LOAD (CBL)-BASED LOAD FORECASTING	957
<i>Myung-Hyun Shim ; Hyeong-Jin Choi ; Seung-Ho Song ; Dong-Jun Won</i>	
OPTIMAL FINITE ELEMENT MODELLING AND 3-D PARAMETRIC ANALYSIS OF STRONG COUPLED RESONANT COILS FOR BIDIRECTIONAL WIRELESS POWER TRANSFER	963
<i>Babatunde Olukotun ; J.S. Partridge ; Richard W. G. Bucknall</i>	

DROOP CONTROL OPTIMIZATION FOR MULTI-TERMINAL HVDC TRANSMISSION SYSTEM.....	969
<i>Astrid Thoen ; Magnus Svean ; Olivier Lebas ; Roni Irnawan ; Fillipe F. Da Silva</i>	
TECHNOLOGY ROADMAP STORAGE: ENERGY STORAGE PERSPECTIVES	975
<i>Barbara Righi Ceci ; Daniel Pinheiro Bernardon ; Luciane Neves Canha ; Tiago Santana</i>	
OPTIMAL SITING OF BESS IN DISTRIBUTION NETWORKS UNDER HIGH PV PENETRATION.....	981
<i>Dimitris A. Raptis ; Papamarkos S. Periandros ; Paschalis A. Gkaidatzis ; Aggelos S. Bouhouras ; Dimitris P. Labridis</i>	
ANALYSIS OF THE ELECTRICITY TARIFFS IN BRAZIL IN LIGHT OF THE CURRENT BEHAVIOR OF THE CONSUMERS	987
<i>Júlia Rambo Hammarstron ; Alzenira Da Rosa Abaide ; Bruna Luise Blank ; Leonardo N. Fontoura Da Silva</i>	
INNOVATIVE SENSOR FOR MULTIPLE CONDUCTOR CABLES TO INCREASE THE SMARTNESS OF THE DISTRIBUTION GRID	993
<i>Andreas Kjaergaard ; Peter Jan Randewijk</i>	
MODELLING THE STATE OF CHARGE OF LITHIUM-ION BATTERIES	999
<i>Ridoy Das ; Yue Wang ; Ghanim Putrus ; Krishna Busawon</i>	
DATA AVERAGING FOR MODELLING ENERGY STORAGE: WHAT INFORMATION IS HIDDEN?	1005
<i>Maja Persson ; Dr Dimitri Mignard ; David Hogg</i>	
A NEURAL NETWORK APPROACH FOR SHORT-TERM FORECASTING OF PV GENERATION IN DWELLINGS	1010
<i>Giorgos S. Georgiou ; Paul Christodoulides ; Soteris A. Kalogirou</i>	
SMALL-SIZE, LOW-WEIGHT, SINGLE-PHASE INVERTER FOR DOMESTIC APPLICATIONS	1016
<i>Vijayakrishna Satyamsetti ; Andreas Michaelides ; Antonis Hadjiantonis ; Anastasis C. Polycarpou ; Thanos Nicolaou</i>	
INFLUENCE OF A DECENTRALIZED HEAT SUPPLY ON THE ELECTRICAL GRID OF A CAMPUS QUARTER	1022
<i>Dominik Maihöfner ; Nicola Rosbach ; Tim Plößer ; Jutta Hanson</i>	
EFFECTIVE POWER MANAGEMENT IN A STAND-ALONE PV SYSTEM	1028
<i>K. Sehil ; M. Darwish</i>	
IMPROVING NETWORK VISIBILITY FOR BETTER INTEGRATION OF LOW CARBON TECHNOLOGIES INTO LV NETWORKS.....	1033
<i>Allison Strachan ; Ian Elders ; Stuart Galloway</i>	
ELECTRIC MOTORS AND SPEED SENSORLESS CONTROL FOR ELECTRIC AND HYBRID ELECTRIC VEHICLES: A REVIEW	1039
<i>Saqib Jamsheed Rind ; Mohsin Jamil ; Anas Amjad</i>	
ROTOR FLUX MRAS BASED SPEED SENSORLESS INDIRECT FIELD ORIENTED CONTROL OF INDUCTION MOTOR DRIVE FOR ELECTRIC AND HYBRID ELECTRIC VEHICLES	1045
<i>Saqib Jamsheed Rind ; Anas Amjad ; Mohsin Jamil</i>	
STRATEGIES TO CONVERT AC INTO DC MEDIUM VOLTAGE GRIDS	1051
<i>Niklas Wehbring ; Raphael Bleilevens ; Bernd Tepsaße ; Jens Priebe ; Albert Moser</i>	
SHORT TERM ELECTRICITY PROCUREMENT OF LARGE CONSUMERS CONSIDERING TIDAL POWER AND ELECTRICITY PRICE UNCERTAINTIES	1057
<i>Arsalan Najafi ; Sanaz Salari ; Moosa Marzband ; Ameena Saad Al-Sumaiti ; Edris Pouresmaeil</i>	
POWER SHARING BETWEEN PARALLEL INVERTERS IN MICROGRID BY IMPROVED DROOP CONTROL.....	1062
<i>Li Lei ; Mohammed A. Elgendy ; Neal Wade ; Salaheddine Ethni ; Hany M. Hasaniien</i>	
A DUAL ANN MODEL FOR ESTIMATION OF INTERNAL IMPEDANCE OF RECHARGEABLE CELL BATTERY	1068
<i>Minella Bezha ; Ryo Gondo ; Naoto Nagaoka</i>	
A COMPARATIVE STUDY AMONG DIFFERENT ALGORITHMS INVESTIGATING OPTIMUM DESIGN OF PID CONTROLLER IN AUTOMATIC VOLTAGE REGULATOR.....	1074
<i>Romany G. George ; Hany M. Hasaniien ; Mohamed Al. Badr ; Mohammed A. Elgendy</i>	
IMPLEMENTATION OF THE PRIME AND G3-PLC PHYSICAL LAYERS IN THE EMT-ATP.....	1080
<i>S. Robson ; A. Haddad ; H. Griffiths</i>	
FAULT CHARACTERISATION OF A DC MICROGRID WITH MULTIPLE EARTHING UNDER GRID CONNECTED AND ISLANDED OPERATIONS	1086
<i>Ahmad Makkieh ; Abdullah Emhemed ; Adria Junyent-Ferre</i>	
SIMULATION OF HIGH VOLTAGE DIRECT CURRENT FILTERS	1092
<i>Calum J. Mackinnon ; Brian G. Stewart</i>	

ISLANDING OF DISTRIBUTION NETWORKS: CHALLENGES AND POTENTIAL SOLUTIONS	1097
<i>Weijie Yan ; Dimitrios Tzelepis ; Adam Dysko</i>	
IMPACT OF RAIN ON TRANSMISSION LINES' AMPACITY: SCOTLAND AS A CASE STUDY	1103
<i>Abdallah Abdaelbaset ; M Emad Farrag ; Shahab Farokhi</i>	
MAXIMUM POWER POINT TRACKING: ADAPTATION LINEAR PREDICTION FOR WIND ENERGY CONVERSION SYSTEMS	1108
<i>Mahinsasa Narayana ; Keith Sunderland ; Ghanim Putrus ; Michael Conlon</i>	
APPLICATION OF SMES FOR VOLTAGE STABILIZATION OF PMSG CONNECTED TO DC GRIDS	1114
<i>Esraa F. Shaaban ; Abd El-Wahab Hassan ; Diaa-Eldin A. Mansour ; Weijia Yuan</i>	
IMPROVED WATER PUMPING STATION SUPPLY SYSTEMS	1119
<i>Martin Harris ; Hassan Nouri ; Hao Yan</i>	
AUDIBLE NOISE CALCULATION FOR DIFFERENT OVERHEAD TRANSMISSION LINES	1125
<i>Indra Kurniawan ; Suwarno ; Oliver Pischler ; Uwe Schichler</i>	
MODELING DYNAMIC FREQUENCY CONTROL WITH POWER RESERVE LIMITATIONS	1131
<i>Le Thi Minh Trang ; Hassan Nouri</i>	
MANAGEMENT OF INVERTER-BASED DISTRIBUTED ENERGY RESOURCES FOR PROVIDING VOLTAGE REGULATION SUPPORT IN ISLANDED OPERATION OF LOW VOLTAGE NETWORKS	1136
<i>Mustafa Alparslan Zehir ; Mustafa Bargiyani ; Aydogan Ozdemir ; Antonio Barbosa ; Filipe Joel Soares ; Carlo Sandroni ; Luigi Pellegrino ; Riccardo Lazzari ; Maurizio Verga ; Unal Kucuk</i>	
POWER BALANCE AND CONTROL OF TRANSMISSION LINES USING STATIC SERIES COMPENSATOR	1141
<i>Mohammed Y. Suliman ; M. Emad Farrag</i>	
REVIEW OF THE EFFECTIVENESS OF IMPULSE TESTING FOR THE EVALUATION OF CABLE INSULATION QUALITY AND RECOMMENDATIONS FOR QUALITY TESTING	1146
<i>Adrian Coughlan ; Joseph Kearney ; Tom Looby</i>	
ASSESSMENT OF THE ACCURACY OF CABLE SHEATH FAULT LOCATION DEVICE AND ENHANCEMENT OF ITS PERFORMANCE	1152
<i>Niall Kennedy ; Joseph Kearney ; Tom Looby ; Ciaran O'leary</i>	
ENERGY MANAGEMENT SYSTEM FOR THE DEMAND RESPONSE IN TUCN BUILDINGS	1156
<i>Bogdan Bărgăuan ; Mihaela Cretu ; Ovidiu Fati ; Andrei Ceclan ; Laura Darabant ; Dan D. Micu ; Denisa Stet ; Levente Czumbil</i>	
OVERVIEW AND ASSESSMENT OF SUPERCONDUCTING TECHNOLOGIES FOR POWER GRID APPLICATIONS	1160
<i>Patrick MCGuckin ; Graeme Burt</i>	
DESIGN AND MODELLING OF PERMANENT MAGNET FAULT CURRENT LIMITER FOR ELECTRICAL POWER APPLICATIONS	1166
<i>Faris Al-Naemi ; Walid Issa ; Asmaiel Ramadan ; Jeremy Hall</i>	
WEIGHTED LEAST SQUARES STATE ESTIMATION FOR COUPLED POWER AND GAS DISTRIBUTION NETWORKS	1171
<i>Martin Pfeifer ; Martin Zimmerlin ; Martin Schwarzenborfer ; Patrick Sauter ; Stefan Krebs ; Thomas Leibfried ; Sören Hohmann</i>	
THE TEACHING OF SWITCHED MODE POWER SUPPLIES – DESIGN, SIMULATION AND PRACTICAL IMPLEMENTATION FOR UNDERGRADUATE AND POSTGRADUATE STUDENTS	1177
<i>M. Darwish ; Al Janbey ; H. Amreiz</i>	
SUPERCAPACITOR APPLICATION FOR PV POWER SMOOTHING	1183
<i>Maria C. Argyrou ; F. Paterakis ; Christina Panagi ; Christos Makarounas ; M. Darwish ; C.C. Marouchos</i>	
INDUSTRIAL ENERGY EFFICIENCY OPTIMISATION THROUGH COGENERATION USING BIOMASS	1188
<i>Muhammad Tahir Hassan ; Stas Burek ; Mohamed Emad Farrag</i>	
A TECHNIQUE FOR PROTECTING THE ROTOR SIDE CONVERTER OF THE DOUBLY FED INDUCTION GENERATOR	1194
<i>Hadi M. El-Helw ; Ahmed Khaled ; Mostafa I. Marei</i>	
ANALYSIS OF FLASHOVER MITIGATION MEASURES TO IMPROVE THE LIGHTNING PERFORMANCE OF TRANSMISSION LINES	1200
<i>Fabian Koehler ; Jonathan Swingler</i>	
APPLICATION OF EMPIRICAL MODE DECOMPOSITION IN IDENTIFYING KEY FREQUENCIES FOR EMI DIAGNOSTIC MEASUREMENTS	1206
<i>J. Slater ; A. Nesbitt ; G. Morison ; P. Boreham ; S. Conner</i>	

NUMERICAL STABILITY STUDIES FOR AC AND DC ELECTRICAL CIRCUITS	1211
<i>Levente Czumbil ; Denisa Stet ; Andrei Ceclan ; Laura Darabant ; Mihaela Cretu ; Dan Micu</i>	
SHARED ENERGY STORAGE AND DIRECT LOAD CONTROL FOR IMPROVED FLEXIBILITY OF DISTRIBUTION SYSTEM OPERATION	1217
<i>Akin Tascikaraoglu ; Ozan Erdinç ; João P. S. Catalão</i>	
CONSUMER-LED POWER MANAGEMENT IN LOCAL DISTRIBUTION NETWORKS	1223
<i>Sima Davarzani ; Ioana Pisica ; Gareth A. Taylor</i>	
SYSTEM IDENTIFICATION OF LOW VOLTAGE DC SOURCES	1229
<i>Matthias Streck ; Nothnagel Frank ; Berger Frank</i>	
FREQUENCY CONTROL OF POWER SYSTEM WITH WIND FARMS BY USING OUTPUT FREQUENCY BAND CONTROL OF HVDC INTERCONNECTION LINE	1235
<i>Kimiko Tada ; Atsushi Umemura ; Rion Takahashi ; Junji Tamura ; Yoshiharu Matsumura ; Daisuke Yamaguchi ; Hirooki Kudo ; Masakazu Niiyama ; Yasuhiro Taki</i>	
CLUSTER ANALYSIS OF UNIVERSITY CAMPUS SMART METER DATA	1241
<i>Anastasia G. Kazaki ; Theofilos A. Papadopoulos</i>	
POWER SWITCHING DEVICE LOSSES – SIMULATION AND NON-SIMULATION METHODS OF CALCULATIONS	1247
<i>Sat Mohanram ; M. Darwish ; C.C. Marouchos</i>	
PROTECTION OF MULTI-TERMINAL VSC-HVDC GRIDS BASED ON THE RESPONSE OF THE FIRST CARRIER FREQUENCY HARMONIC CURRENT	1253
<i>Mani Ashouri ; Hesam Khazraj ; Filipe Faria Da Silva ; Claus Leth Bak</i>	
CYBER-ATTACKS RELATED TO INTELLIGENT ELECTRONIC DEVICES AND THEIR COUNTERMEASURES: A REVIEW	1258
<i>Jingyu Wang ; Dongyuan Shi</i>	
TUNING METHOD FOR VSC CURRENT CONTROLLER GAINS AIMED AT OPTIMIZED SETTLING TIME AND DAMPING RATIO	1264
<i>Jiebei Zhu</i>	
MULTI-OBJECTIVE OPTIMAL ACTIVE AND REACTIVE POWER DISPATCH FOR CENTRALLY CONTROLLED DISTRIBUTED PV SYSTEMS	1270
<i>Colin Levis ; Chi-Thang Phan-Tan ; Martin Hill</i>	
SENSITIVITY ANALYSIS OF HVDC-LCCS AFFECTED BY VOLTAGE UNBALANCE GENERATED BY ELECTRIC TRAINS	1276
<i>Troels Jakobsen ; Morten Vadstrup ; Jakob Harder Poulsen ; Maria Stenseth ; Richard Mushimiye ; Filipe Miquel Faria Da Silva</i>	
ANALYSIS OF MODEL SIMPLIFICATION FOR A SYSTEM IMPOSED BY VOLTAGE UNBALANCE GENERATED BY ELECTRIC TRAINS	1281
<i>Maria Stenseth ; Jakob Harder Poulsen ; Morten Vadstrup ; Troels Jakobsen ; Richard Mushimiye ; Filipe Miquel Faria Da Silva ; Athanasios Stamatopoulos</i>	
A MODIFIED P&O-MPPT BASED ON PYTHAGOREAN THEOREM AND CV-MPPT FOR PV SYSTEMS	1287
<i>Sadeq D. Al-Majidi ; Maysam F. Abbod ; Hamed S. Al-Raweshidy</i>	
ALGEBRAIC MODELLING OF CONVERTERS WITHOUT DC FAULT RIDE-THROUGH CAPABILITY FOR SHORT CIRCUIT CURRENT CALCULATION OF DC DISTRIBUTION GRIDS	1293
<i>Raphael Bleilevens ; Albert Moser</i>	
COMPARATIVE STUDY OF PREDICTIVE-FIXED SWITCHING TECHNIQUES FOR A CASCADED H-BRIDGE TWO LEVEL STATCOM	1299
<i>Alfredo Renault ; Magno Ayala ; Leonardo Comparatore ; Julio Pacher ; Raul Gregor</i>	
PLANNING AND DESIGN OF MEDIUM VOLTAGE DC GRIDS– AN OVERVIEW	1305
<i>Jens Priebe ; Niklas Wehbring ; Albert Moser</i>	
DESIGN OF MEDIUM VOLTAGE DC GRIDS– IMPACT OF POWER FLOW CONTROL ON GRID STRUCTURE	1311
<i>Jens Priebe ; Niklas Wehbring ; Albert Moser</i>	
IMPACT OF VIRTUAL INERTIA ON INCREASING THE HOSTING CAPACITY OF ISLAND DIESEL-PV AC-GRID	1317
<i>C. Z. Ally ; Y. Sun ; E. C. W. De Jong</i>	
MICROGRID DESIGN FOR RURAL ISLAND IN PEA AREA	1323
<i>Chakphed Madtharad ; Tanaporn Chinabut</i>	
GENERIC DYNAMIC LOAD MODELLING USING CLUSTER ANALYSIS	1328
<i>Georgios A. Barzegkar-Ntovom ; Oguzhan Ceylan ; Theofilos A. Papadopoulos ; E. Fatih Yetkin</i>	
Author Index	